

WHAT IS CLAIMED IS:

1. A balloon catheter, comprising
- a) an elongated shaft having a proximal end, a distal end,
5 and an inflation lumen;
- b) a balloon on a distal shaft section, having an inflatable interior which is in fluid communication with the inflation lumen; and
- c) a tip member on a distal end of the catheter having a proximal end spaced distally apart from the distal end of the elongated shaft.

10 2. The catheter of claim 1 wherein the balloon inflatable interior is spaced proximal to the distal end of the elongated shaft.

15 3. The catheter of claim 1, wherein the tip member has a lumen extending therein in fluid communication with a lumen in the elongated shaft.

4. The catheter of claim 1, wherein the tip member is softer than the catheter shaft.

20 5. The catheter of claim 1, wherein the tip member is formed of a polymeric material having a Shore Durometer hardness lower than a Shore Durometer hardness of a polymeric material forming at least a section of the catheter shaft.

6. The catheter of claim 1, wherein the tip member proximal end is spaced apart from the distal end of the catheter shaft by about 0.05 to about 0.3 mm.

7. The balloon catheter of claim 1, including a sheath which is bonded to the catheter shaft and the tip member, and which has a section extending from the distal end of the catheter shaft to the proximal end of the tip member.

8. The balloon catheter of claim 7, wherein the sheath comprises a distal shaft section of the balloon.

9. The balloon catheter of claim 8 wherein the balloon distal shaft section has an inner surface in surrounding relation and bonded to an outer surface of the catheter shaft and an outer surface of the tip member.

10. The balloon catheter of claim 8 wherein the balloon distal shaft section has a tapered outer surface.

11. The balloon catheter of claim 8, wherein the catheter shaft includes a guidewire lumen extending at least within the distal shaft section

of the catheter, wherein at least a portion of the balloon distal shaft section defines a section of the guidewire lumen.

12. The balloon catheter of claim 11, including a gap between the
5 distal end of the catheter shaft and the proximal end of the tip member, the balloon distal shaft section extending over the gap.

13. The balloon catheter of claim 11, wherein the portion of the
balloon distal shaft section extends between a transverse surface of the
10 distal end of the shaft and a transverse surface of the proximal end of the tip member.

14. The balloon catheter of claim 13, wherein the portion of the
balloon distal shaft section has an inner surface which defines a section of
15 the guidewire lumen and which is substantially axially aligned with an inner surface of the tip member.

15. The balloon catheter of claim 7 including an intermediate
member secured to and extending between the distal end of the catheter
20 shaft and the proximal end of the tip member.

16. The balloon catheter of claim 15 wherein the intermediate

member is formed of a polymeric material having a lower Shore Durometer hardness than a polymeric material forming the catheter shaft, and a higher Shore Durometer hardness than a polymeric material forming the tip member.

5 17. The balloon catheter of claim 1 wherein the catheter shaft comprises an outer tubular member defining the inflation lumen and an inner tubular member disposed within at least a section of the outer tubular member and defining a guidewire lumen, wherein the distal end of the inner tubular member is spaced apart from the proximal end of the tip member.

10 18. The balloon catheter of claim 17 wherein the balloon distal shaft section is secured to the inner tubular member.

15 19. A balloon catheter, comprising

 a) an elongated shaft having a proximal end, a distal end, an outer tubular member defining the inflation lumen, and an inner tubular member disposed within at least a section of the balloon and defining a guidewire lumen;

 b) a balloon on a distal shaft section having an interior in

20 fluid communication with the inflation lumen; and

 c) a tip member on a distal end of the catheter having a proximal end spaced distally apart from the distal end of the inner tubular

member.

20. A method of forming a distal tip of a balloon catheter,
comprising

5 a) positioning a proximal end of a tip member and a distal
end of a catheter shaft within a lumen of a balloon distal shaft section, so
that the proximal end of the tip member is distally apart from the distal end
of the catheter shaft; and

b) fusion bonding the balloon distal shaft section to the
10 catheter shaft and the tip member by applying heat to at least a portion of
the balloon distal shaft section, to form a balloon catheter distal tip having
the tip member proximal end fusion bonded to the balloon distal shaft section
and spaced distally apart from the distal end of the catheter shaft.

15 21. The method of claim 20 wherein step (a) in claim 20 further
comprises forming a space between a transverse surface of the distal end of
the shaft and a transverse surface of the proximal end of the tip member,
and step (b) of claim 20 further comprises heating the balloon distal shaft
section so that the balloon material flows into at least a part of the space
20 between the proximal end of the tip member and the distal end of the
catheter shaft.

